

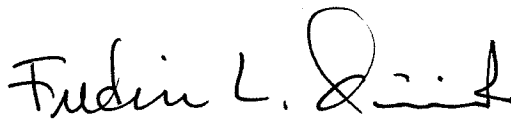
ASARCO Chapter 11 Bankruptcy

Case No. 05-21207

EXPERT REPORT

of

FREDRIC L. QUIVIK, PhD.



15 June 2007

INTRODUCTION

I. GENERAL REMARKS

A. Personal Background/Qualifications

I am Fredric L. Quivik, a consulting historian of technology living in Philadelphia, Pennsylvania. I testified in January 2001 and again in June 2001 in the liability phase of *U.S. v. Asarco, et al*, the Bunker Hill Superfund litigation in Idaho. In 1999, I had begun working under contract to the DOJ as an expert witness in *U.S. v. Asarco*. I prepared an expert report in August 1999, which provided a detailed history of the mines and mills (also called concentrators) of the Coeur d'Alene mining district and of the movement of tailings, discharged by the numerous mills in the mining district, through the hydrologic system of the Coeur d'Alene River and its tributaries. That report was organized by mill (and its associated mines), and for each mill I described its corporate history. Several of the mines and mills were owned and operated by Asarco and its predecessors. In the process of writing that expert report, therefore, I developed expertise in the history of activities of Asarco and its predecessors in the Coeur d'Alene Basin.

I have been a consultant since 1982, when I formed an historic preservation consulting firm, Renewable Technologies, Inc. (RTI), in Butte, Montana. Having been educated in architecture and historic preservation, I began to specialize in historic sites with engineering or industrial significance, including bridges, dams, and mining facilities. I completed an assortment of large contracts analyzing various facets of the history of the industrialization of the American West.

In 1990, I left RTI (which is still a thriving business in Butte) to pursue a PhD in the Department of History and Sociology of Science at the University of Pennsylvania, specializing in the history of technology. During three years resident in Philadelphia, I completed all coursework and exams necessary for the PhD. During the summers of those years, I worked for the Historic American Engineering Record, National Park Service, writing a business and technological history of the Connellsville coke region in southwestern Pennsylvania, gaining additional expertise in the coal and coke industry and the metallurgy of iron and steel. In spring 1998, I completed my PhD dissertation, titled "Smoke and Tailings: An Environmental History of Copper Smelting Technologies in Montana, 1880-1930." I received the PhD degree from the University of Pennsylvania in August 1998.

In spring 1994, I began working under contract to the U.S Department of Justice (DOJ) as an expert witness in *U.S. v. ARCO*, the Clark Fork Superfund litigation in Montana. In that capacity, I prepared expert reports for both the Environmental Enforcement Section of the DOJ and the Environmental Defense Section. The reports provided detailed histories of the production of the metallurgical byproducts of tailings, smoke, and slag by the several historic mining, milling, and smelting companies active in Butte and Anaconda. The reports described how the companies discharged their byproducts, how they managed the byproducts (if they did), and historical events that caused the byproducts to change location or character.

In late 1998, at about the same time I began working on *U.S. v. Asarco*, I began working under contract to the firm of Beshears Muchmore Wallwork, attorneys for the plaintiffs in *Pinal Creek Group v. Newmont Mining Corporation, et al*, being tried in federal court in Arizona. I prepared an expert report in February 2000, providing a detailed operational history of the Inspiration Consolidated Copper Company in the context of the larger corporate history of the Anaconda Copper Mining Company. I prepared a Supplemental Expert Report in January 2002, which provided additional details on the corporate relationships between Inspiration and Anaconda.

In July 2002, I prepared an expert report for the United States in *U.S. v. W.R. Grace*, the Libby Superfund case in Montana. In that report, I provided a detailed description of the mining, milling, and waste-disposal practices for a vermiculite mine (with asbestos in the ore body) that operated from the early 1920s until 1990.

In October 2006, I completed an expert report for the Coeur d'Alene Tribe of Indians as part of a mediation process between the Tribe and Avista Corporation. My expert report concerned issues stemming from Avista's operation of a system of hydroelectric generating stations along the Spokane River and of a dam that impounds water in Lake Coeur d'Alene with consequent impact on Tribal lands.

In November 2006, I completed an expert report in *U.S. v. Newmont USA Limited*, the Midnite Mine Superfund case in the Eastern District of Washington. My client was again the Environmental Enforcement Section of the DOJ. The report concerned the history of the corporate relationship between Newmont and its subsidiary Dawn Mining Company.

I have also prepared expert reports or testimony for Superfund sites involving a gold/antimony/tungsten mine in Idaho (*Mobil Oil v. U.S.*) and a tungsten processing facility on Long Island (*U.S. v. TDY Holdings*).

In addition to my testimony at trial in *U.S. v. ASARCO* in January and June 2001, I have testified in deposition relative to my expert reports in the other above-named cases, with exception of *U.S. v. TDY Holdings*, for which I testified at a mediation hearing in January 2005, and the Coeur d'Alene Tribe/Avista matter, which is still pending. I also served as a section 30(b)(6) witness on behalf of the United States in *U.S. v. ARCO*.

A detailed list of my education, professional undertakings, and publications is presented in my resume, attached to this report as Appendix A.

B. Compensation

I am being compensated by the United States Department of Justice as an expert witness in the case *U.S. v. ASARCO* at the rate of \$160.00/hr. for pre-trial consulting and at the rate of \$240.00/hr. for depositions and trial testimony.

II. SUMMARY OF OPINIONS

A. Introduction

In August 1999, I submitted an Expert Report on behalf of the United States in *U.S. v. Asarco, et al*, wherein I described the history of mining and milling in the Coeur d'Alene mining district with an emphasis on the movement of tailings and other solids through the rivers and streams of the Coeur D'Alene Basin. The report was arranged by river or tributary, and in the case of the South Fork Coeur d'Alene River, by reach of the river (upper, middle, and lower). For each river, reach, or tributary, I described the history of each significant mill that operated there and then provided an overall history of the movement of tailings through that particular river/reach/tributary as conditions affecting that movement changed over time. As part of the history of each mill, I provided a corporate succession for ownership and operations. For each mill, I also described the history of the mine or mines associated with it. In the process, I developed a history of the presence of Asarco and its predecessors in the basin.

My opinions regarding issues of this case have not changed since I prepared the 1999 report and I incorporate those opinions herein. A copy of my 1999 report is appended to this report.

In particular, it is my opinion that Asarco and/or its predecessors conducted activities in most of the reaches of tributaries of the Coeur d'Alene mining district. Those activities are summarized below:

B. Upper Coeur D'Alene River

Morning Mine & Mill: Thomas Greenough and Peter Larsen, owners of the Morning mine and mill, sold the properties in 1905 to the Federal Mining & Smelting Company, a predecessor of Asarco. The mill was located adjacent to the South Fork just below the town of Mullan. It was linked to the mine (located up a small drainage that ran through Mullan) by means of a narrow-gage railroad that was part of the integrated operation. Federal operated mine and mill almost continuously into the 1950s. Asarco and Federal merged in 1953, and Asarco took over all of Federal's operations in the Coeur d'Alene mining district. Asarco closed the Morning mine later that year but continued to operate the Morning mill on ores from the Frisco mine (another property owned by Federal) until the close of 1956, when the Frisco mine also closed.

C. Canyon Creek

Tiger-Poorman: Federal Mining & Smelting Company, a predecessor company of Asarco, acquired the Tiger-Poorman properties in 1903 by acquiring the stock of the Empire State-Idaho Mining and Development Company, which owned and operated the Tiger-Poorman mine and mill. Deeds of the properties were conveyed to Federal at the beginning of 1904. The mill was located along Canyon Creek at Burke and the mine opening was along the south side of the creek

nearby. Federal operated the mill until 1907 and the mine for another year. After 1908, Federal only operated the Tiger-Poorman mine intermittently by means of leasers. Federal leased the Tiger-Poorman mill to the Hercules Mining Company in 1909 for about a year. In 1920, the Hecla Mining Company bought the Tiger-Poorman property from Federal.

Frisco/Black Bear: The Frisco Consolidated Mining Company owned and operated the Frisco mine and mill along Canyon Creek below Burke. In 1900, the Frisco Consolidated Mining Company bought the nearby Black Bear mine and mill from Thomas Greenough and Peter Larsen. By 1913, however, the Frisco properties were only operating intermittently. That year, the Federal Mining & Smelting Company, an Asarco predecessor, bought the Frisco properties, which were just over the ridge from Federal's Morning mine above Mullan. Rather than trying to get the Frisco mill operating again, Federal remodeled the Black Bear mill, which it had acquired among the Frisco properties. Federal got put the Frisco mine and new Frisco (old Black Bear) mill in operation in 1914, but results were unsatisfactory. After trying a number of improvement over the course of a couple years, Federal closed its Frisco operation at the end of 1916. Federal sold the new Frisco mill to the Tamarack & Custer Consolidated Mining Company in 1917.

Standard-Mammoth: The Federal Mining & Smelting Company, an Asarco predecessor, had a mining and milling operation in Canyon Creek called Standard-Mammoth. Before being consolidated by Federal, it had been two distinct mining companies and operations. The Standard Mining Company had a mine along Canyon Creek at Mace and a mill near the mouth of Canyon Creek just above Wallace. The Mammoth Mining Company had its mine near the Standard's mine at Mace and had its mill along lower Canyon Creek, 200 feet north of the Standard mill. Federal acquired both properties in 1903 and began to consolidate their operations. Federal leased the Mammoth mill to the Stewart Mining Company during the period 1910-1917. Early in 1917, Federal again used the Mammoth mill for its own ore, in particular ore mined at the Morning mine. That practice lasted only a short time. In 1912, Federal began leasing the Standard mill to the Green Hill-Cleveland Mining Company, a venture formed by Federal and other investors to mine an extension of the Mammoth vein at Mace. The Standard mill operated under lease through 1917. Neither the Standard nor the Mammoth mill operated after that.

Canyon Creek Tailings Association: The mills along Canyon Creek, including those operated by Asarco predecessor Federal Mining & Smelting, discharged their tailings directly into the stream, which carried them downstream. Property owners and communities downstream complained to the mining companies that tailings were damaging their property and filling the channel of the South Fork Coeur d'Alene River, making it more prone to flood. The mining companies responded, in part, by forming associations to build crude dams to impound tailings. One such dam was the Canyon Creek tailings dam, located near the lower end of Woodland Park, a broad area in Canyon Creek that would afford some room for tailings storage. Four companies, Federal, Frisco, Hecla, and Hercules, formed the Canyon Creek Tailings Association in 1906 and shared in the costs of building and maintaining the Canyon Creek dam.

D. Nine-Mile Creek

I have no information to suggest that Asarco was active in the Nine-Mile Creek drainage.

E. Middle South Fork River

Galena: The Callahan Zinc-Lead Company developed the Galena mine and mill along Lake Creek in the 1920s. Lake Creek is a tributary of the South Coeur d'Alene River. The company sold the mill to the Zanetti Brothers in 1941. The Zanettis used the mill to treat ores from a variety of mines and to reprocess tailings until 1954, when they sold it to Asarco. By this time, the Callahan Lead-Zinc Company had put the Galena mine in the hands of the Vulcan Silver-Lead Company, of which Callahan owned 63%. In 1947, Vulcan had leased the Galena mine to Asarco, which in turn formed a joint venture with Day Mines, Inc., to explore the Galena mine. Asarco held the controlling interest (75%) in the venture and assumed the role of operator. Asarco put both the mine and mill in full-scale production early in 1955. The Galena mine became the nation's second-largest silver producer by the late 1960s. Mine and mill operated into the 1990s.

Coeur: The Coeur d'Alene Mines Corporation acquired the Mineral Point group of mining claims in about 1930. The claims were located along McFarren Gulch, a tributary of the South Coeur d'Alene River and had been worked intermittently since the 1890s. The Coeur d'Alene Mines Corporation developed the claims during the 1930s and then built a mill along McFarren Gulch in 1940. The company operated both mine and mill until 1951. Coeur d'Alene Mines formed a joint venture with Asarco in the 1960s to resume exploration of the Mineral Point claims. After a decade of exploration and development for what the two companies called the Coeur project, they decided to build a new mill and go into production together with Asarco as the operating partner. The Coeur mine and mill went into production in 1976, and by the 1980s the Coeur project was one of the nation's largest silver producers. Mine and mill closed in 1991. Asarco and Coeur d'Alene Mines Corporation consolidated their Coeur and Galena properties in 1995.

Osburn tailings dam & impoundment: In 1901, responding to complaints from downstream property owners, members of the Mine Owners Association built a pile-and-plank dam on the South Fork Coeur d'Alene River just above the village of Osburn to impound tailings. Mining companies that contributed to the costs of acquiring land for the tailings reservoir and of building and maintaining the dam were those that operated mines and mills along the South Fork upstream of the dam as well as along Nine-Mile Creek and Canyon Creek. Standard Mining Company, Mammoth Mining Company, Buffalo Hump Mining Company, Morning Company (Larsen and Greenough) were members of the association that operated mills that would soon be owned and operated by the Federal Mining & Smelting Company, a predecessor of Asarco. By 1906, Federal had acquired the mills in question (and described above) and was taking an active role in the maintenance of the dam. By 1917, the dam was seriously deteriorated. Despite the efforts to repair the dam made by crews working for Federal, floods destroyed the dam that year.

E. Milo Creek

Last Chance: Charles Sweeney's Last Chance Mining Company built its mill near its mines along Milo Creek above Wardner in 1889. In 1898, Sweeney had formed the Empire State-Idaho Mining & Development Company to take over his Last Chance properties. Sweeney announced the following year that he would build a new mill for his Wardner mines along the South Fork Coeur d'Alene River below Kellogg. When the new mill opened in 1901, the Last Chance mill closed. The Federal Mining & Smelting Company, another enterprise organized by Sweeney and an Asarco predecessor, acquired the Empire State-Idaho at Wardner in 1903. Although the Last Chance mill was closed by then, Federal continued to operate the mines above Wardner and send their ores to the mill below Kellogg until 1918.

F. Lower Coeur d'Alene River

Sweeney mill: As noted above, the Empire State-Idaho Mining & Development Company built a new mill, named for Charles Sweeney, along the South Fork Coeur d'Alene River below Kellogg. The mill went into operation in 1901, treating ores from the Last Chance group of mines above Wardner. In 1903, the Federal Mining & Smelting Company acquired the Empire State-Idaho properties, including the Sweeney mill. Federal operated the Last Chance mines and the Sweeney mill until 1916 and deeded the properties to the Bunker Hill & Sullivan Mining & Concentrating Company in 1918.

Page: In 1925, the Federal Mining & Smelting Company, an Asarco predecessor, began work re-developing the Page and Blackhawk mines, intending to operate them as a single mine. The mines were located south of Smelterville on Silver and Grouse creeks, which are tributaries of the South Fork Coeur d'Alene River. Federal built its new Page mill along Silver Creek in 1926. Federal operated the Page mine and mill continuously through the rest of the 1920s, intermittently during the Great Depression of the 1930s, and continuously again throughout the 1940s. Asarco and Federal merged in 1953, with Asarco taking over operations of Federal's mines and mills in the Coeur d'Alene mining district, including the Page mine and mill. Asarco closed its Page properties in 1969.

Pine Creek tailings dam & impoundment: In 1901, responding to complaints from downstream property owners, members of the Mine Owners Association acquired land to build a pile-and-plank dam on the South Fork Coeur d'Alene River just above the mouth of Pine Creek to impound tailings. Mining companies that contributed to the costs of acquiring land for the tailings reservoir were those that operated mines and mills along the South Fork upstream of the dam as well as along Canyon Creek and Milo Creek. Standard Mining Company, Mammoth Mining Company, Frisco Mining Company, Empire State-Idaho Mining & Development Company, Morning Company (Larsen and Greenough) were members of the association that operated mills that would soon be owned and operated by the Federal Mining & Smelting Company, a predecessor of Asarco. The same predecessors of the Federal Mining & Smelting Company helped pay the costs of constructing the dam. The Mine Owners Association completed the dam in 1902. Federal played an active role in maintaining the dam. It washed out during the winter flood of 1917-18.

G. Pine Creek

I have no information to suggest that Asarco was active in the Pine Creek drainage.

H. North Fork Coeur d'Alene River

Jack Waite: The Jack Waite mine is located in the drainage of the North Fork Coeur d'Alene River. It began producing as early as 1911, and the Jack Waite Leasing Company built a mill near it in 1925. Asarco acquired mine and mill in 1929 and continued operating it thereafter, sometimes intermittently.

I. Coeur d'Alene River

Tailings Easements and Law Suits: Tailings from the mills of the Coeur d'Alene mining district flowed below the confluence of the North Fork and South Fork into the Coeur d'Alene River itself, and property owners along the river registered complaints and filed suits against the mining companies. One response of the companies was to pool their money and, working in concert, purchase tailings easements from property owners that would release the companies from liability for damages caused by any tailings that might deposit on properties with such easements. Five companies decided in 1910 to pool some money and begin purchasing such easements. The Federal Mining & Smelting Company, an Asarco predecessor, was the leading contributor to the easement fund, paying almost 58%. The companies also used the money that they jointly collected from each other to pay legal costs and settlements associated with complaints brought against them.

Cataldo dredge: In the 1930s, the mining companies of the Coeur d'Alene mining district took another step to try to address potential problems associated with tailings they had been discharging into the streams of the basin. By that time, most mills had converted to flotation, which meant that tailings were quite fine. As a consequence, large volumes of slimes, or fine tailings, were being carried downstream as far as the Cataldo Mission, where the Coeur d'Alene River flows into an arm of Lake Coeur d'Alene. Where the flow of the river meets slack water, solids dropped out of suspension. People living around the lake grew concerned that accumulations of metallurgical wastes on the lake bed might pose a threat to human health. Responding to those concerns, three mining companies, including the Federal Mining & Smelting Company, an Asarco predecessor, installed a dredge in the river near the mission to remove material that had settled to the river bottom and pump it onto land adjacent to the river. The mining companies had already acquired much of the land needed to receive dredge spoils, and they used their "dredge fund" to acquire the rest. A Spokane bank and a Wallace bank held the land in trust for the mining companies. The dredge went into operation in July 1932. The mining companies dredged the river bed by the mission annually thereafter through 1968. Each year, the dredge operated from about June until the river froze, typically in December. Each year the dredge removed about a million tons of tailings and other fine solids from the river bed, and each year during winter and spring the river would refill the dredge basin with solids washed

down from the mining and milling districts upstream. During the dredge's period of operation, most, if not all, of the companies operating concentrators in the Coeur d'Alene district contributed to the "dredge fund," renewed each year by annual assessments of the mining companies. Federal Mining & Smelting was one of the major contributors until 1953 when it merged with Asarco, at which time Asarco became a major contributor to the "dredge fund."

III. ANTICIPATED EXHIBITS TO BE USED AT TRIAL

- * This expert report
- * My 1999 expert report in U.S. v. ASARCO, et al., including all attachments and references
- * Any trial exhibits used in that case
- * Illustrative maps of the Coeur d'Alene mining district and the Coeur d'Alene Basin
- * Historic photographs
- * Charts summarizing any opinions contained in this and my previous report

IV. MATERIALS CONSIDERED and METHODS USED

The materials I considered in preparing the attached 1999 report include documents, artifacts, and landscapes I studied relative to the Coeur d'Alene mining district. Specific references upon which my findings were based are cited in the footnotes of the 1999 report. Documents cited include secondary sources, historic technical and professional journals and texts, manuscript collections in public archives, and historic corporate collections of the defendant companies provided in discovery by them. I provided copies to the DOJ of all cited documents I discovered during my own researches and which are not already part of the databases assembled by DOJ. I also provided copies of documents I discovered and which pertain to the Coeur d'Alene district but which I did not cite in the 1999 report.

While researching and writing the 1999 report, I employed Jennifer Stevens. At the time, Ms. Stevens had a Master of Arts in History from the University of California at Santa Barbara and was a PhD student at the University of California at Davis, specializing in environmental history. She had had several years of prior experience working in litigation support on environmental cases. All of Ms. Stevens' work on the expert report was conducted under my supervision. She conducted research in the DOJ data base and in primary and secondary sources. She made copies of all pertinent materials she found, and those copies are part of the collection I submitted to the DOJ. I assigned Ms. Stevens several distinct research topics, and she wrote draft portions of the report based on her research. I reviewed and edited all of the portions that she wrote before incorporating them into my 1999 report.

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RESUME

SUMMARY OF EXPERIENCE

Since 1976, Dr. Quivik has been professionally active in the fields of history of technology, industrial archeology, and cultural resource management. He makes that experience available to clients as the principal historian in the firm Quivik Consulting Historian, Inc., which he incorporated in 1998. A significant body of his work in recent years has been as an expert witness (historian of technology) in Superfund litigation concerning the remediation of mining and metallurgical wastes in Montana (the Clark Fork Superfund project embracing Butte and Anaconda and the Libby Superfund project), Idaho (the Bunker Hill Superfund project in the Coeur d'Alene mining district, and the Stibnite Superfund project in the Yellow Pine district), and Arizona (the Pinal Creek project, embracing the Globe/Miami mining district).

In 1982, Dr. Quivik founded Renewable Technologies, Inc. (RTI), an historic preservation consulting firm in Butte, Montana, that is still a thriving business. In 1990, Dr. Quivik left RTI to attend the University of Pennsylvania, where he was a William Penn Fellow. He received the PhD in History and Sociology of Science from Penn in 1998. The title of his dissertation is "Smoke & Tailings: An Environmental History of Copper Smelting Technologies in Montana, 1880-1930." While writing his dissertation, he continued to work as a consultant.

As an expert witness for the U.S. Dept. of Justice, providing litigation support in Superfund litigation, Dr. Quivik's specialty has been the history of the metallurgical technologies used at Butte and Anaconda, the Coeur d'Alenes, and other mining districts, with special attention to the discharge of byproducts and their historic impact on the environment. He has extensive knowledge of the role of industrialization in the development of the American West. At RTI, he completed surveys and HAER documentation of dams and hydroelectric generating plants of the Montana Power Company, of the Corps of Engineers' Fort Peck Dam, and of Bureau of Reclamation dams and irrigation infrastructure in Idaho, New Mexico, Oregon, and Wyoming. He conducted statewide historic bridge inventories in Minnesota, Montana, Nebraska, and North and South Dakota. He has also prepared a business and technological history of the Connellsville Coke Region in southwestern Pennsylvania for the Historic American Engineering Record/America's Industrial Heritage Project.

Dr. Quivik's experience in cultural resource management includes conducting surveys of rural, urban, and industrial historic sites and districts, preparing National Register nominations, performing determinations of eligibility and impact assessments according to federal guidelines, preparing photo-documentation and measured drawings of historic sites, and developing planning documents for the preservation of historic districts. Dr. Quivik is particularly skilled at researching and developing historical contexts within which to assess the significance of cultural resources. He is also skilled at large-format (4 x 5) photographic documentation of buildings and structures meeting HABS/HAER standards. He served for ten years on the Montana State Historic Preservation Review Board.

Dr. Quivik is an instructor in the Dept. of History & Sociology of Science at the University of Pennsylvania. While living in California for three years, he was a lecturer in the history of science and technology in the Interdisciplinary Studies Program, College of Engineering, and in the History Dept., both at the University of California at Berkeley. In previous years, he taught at Montana Tech in Butte and at Montana State University in

Bozeman.

EDUCATION

PhD, History and Sociology of Science, University of Pennsylvania, Philadelphia, 1998.
Dissertation title: "Smoke and Tailings: An Environmental History of Copper Smelting Technologies in Montana, 1880-1930." M.A., 1992.

Master of Science in Historic Preservation, Graduate School of Architecture and Planning,
Columbia University, New York City, 1977.

Bachelor of Environmental Design, School of Architecture, University of Minnesota,
Minneapolis, MN, 1975.

Bachelor of Arts in Art, St. Olaf College, Northfield, MN, 1971.

EMPLOYMENT HISTORY

Consulting Historian of Technology, principal in the firm Quivik Consulting Historian, Inc.,
working in litigation support as an expert witness, and in the evaluation of historic
industrial and engineering sites as a cultural resources consultant, 1994-present.

Instructor, history of technology, environmental history, Dept. of History and Sociology of
Science, University of Pennsylvania, Philadelphia, spring semesters 2006, 2007.

Lecturer, history of technology, Interdisciplinary Studies Program, College of Engineering,
University of California at Berkeley, January 1999 to May 2001; history of American
science and technology, Dept. of History, U.C. Berkeley, January to May 2000.

Historian, Historic American Engineering Record, U.S. Dept. of the Interior, Jeannette, PA,
June to August 1991, June to September 1992.

Architectural Historian (and founder), Renewable Technologies, Inc., Butte, MT, May 1982
to August 1990.

Adjunct Assistant Professor, School of Architecture, Montana State University, Bozeman,
MT, winter quarter 1983.

Instructor, Historic Preservation, Montana State Univ., Bozeman, winter quarter 1982;
Montana College of Mineral Science & Technology, Butte, MT, fall semester 1979.

Instructor, Engineering Graphics, Montana College of Mineral Science and Technology,
Butte, MT, January 1981 to May 1981 (spring semester).

Building Recycling Specialist, National Center for Appropriate Technology, Butte, MT, April
1977 to September 1981.

Historian, Historic American Engineering Record, U.S. Dept. of Interior, Butte, October
1979 to April 1981.

PROFESSIONAL AFFILIATIONS

Society for Industrial Archeology: past-president 6/98 to 6/00; president 6/96 to 6/98; vice president 6/94-6/96; national Board of Directors 6/90-6/93.
 Capitol Advisory Council (Montana), appointed by Gov. Racicot 1/96 to 8/98.
 Klepetko (Montana) Chapter, Society for Industrial Archeology, president 9/87-8/90.
 Committee on Historic and Archeological Preservation in Transportation, Transportation Research Board of the Nat'l Research Council, 1/91 to 6/93.
 Board of Directors, Butte-Anaconda Historical Park and Railroad Corporation, 1986-1990.
 Montana Historic Preservation Review Board, 1981-1990: appointed by Governor Schwinden, 10/81; reappointed 10/85; elected chairperson, 12/87.
 Montana State Capitol Restoration Advisory Panel, appointed by House Speaker John Vincent, 5/85-4/89.
 Board of Directors, Butte-Silver Bow Public Archives, 1979-1986.
 Society of Architectural Historians.
 Society for the History of Technology.
 American Society for Environmental History
 History of Science Society
 Western History Association
 Organization of American Historians
 Norwegian-American Historical Association

SCHOLARLY and OTHER PUBLICATIONS

"The Tragic Montana Career of Dr. D.E. Salmon," in *Montana: The Magazine of Western History* 57 (Spring 2007): 32-47, 92-94

"New Deal Oasis on the High Plains," a "Montana Traveler" feature on Fort Peck in *Montana: The Magazine of Western History* 54 (Winter 2004): 69-74.

"Smelters" and "Tailings," two entries in the *Encyclopedia of World Environmental History* (New York & London: Routledge, 2004).

"Of Tailings, Superfund Litigation, and Historians As Experts: *U.S. v. Asarco, et al*, the Bunker Hill Superfund Case in Idaho," in *The Public Historian* 26 (Winter 2004): 81-104.

"Gold & Tailings: The Standard Mill at Bodie, California," in *IA: The Journal of the Society for Industrial Archeology* vol. 29, no. 2 (2003): 5-27.

"Integrating the Preservation of Cultural Resources with the Remediation of Hazardous Materials: An Assessment of Superfund's Record," in *The Public Historian* 23 (Spring 2001): 47-61.

"Landscapes as Industrial Artifacts: Lessons from Environmental History," in *IA: The Journal of the Society for Industrial Archeology*, vol. 26, no. 2 (2000): 55-64.

"The Historic Industrial Landscape of Butte and Anaconda," in *Images of an American Land: Vernacular Architecture Studies in the Western United States*, Thomas Carter, ed. (Albuquerque: University of New Mexico Press, 1997).

Butte & Anaconda Revisited: An Overview of Early-Day Mining and Smelting in Montana, with Brian Shovers, Dale Martin, and Mark Fiege, Special Publication 99 (Butte: Montana Bureau of Mines, 1991). This is a reprint of "Guidebook to Historic Industrial Resources of Butte and Anaconda," October 1989, prepared by the same authors for the Annual Fall Tour of the Society for Industrial Archeology.

"Steel Transmission Towers & Energy for Montana's Copper Industry," Historic Landscapes feature in *Montana: The Magazine of Western History*, 38 (Fall 1988): 67-69.

"The Anaconda Company Smelters at Great Falls and Anaconda," in *The Speculator: The Journal of Butte and Southwest Montana History*, 1 (Summer 1984), expanded version of a paper given at the Annual Meeting of the Society for Industrial Archeology, St. Paul, MN, May 1983.

"Montana's Minneapolis Bridge Buildings," in *IA: The Journal of the Society for Industrial Archeology*, 10 (1984), no. 1, expanded version of a paper given at the Annual Meeting of the Society for Industrial Archeology, St. Paul, MN, May 1983.

Historic Bridges in Montana, (Washington, DC: U.S. Department of the Interior, National Park Service, Historic American Engineering Record, 1982).

"A Comparison Between Passive Solar and Superinsulated Retrofits," paper given at the Sixth National Passive Solar Conference, Portland, OR, September 1981. Published in the *Conference Proceedings*, AS/ISES, 1981.

"Retrofitting with Passive Solar," paper published in *New Energy From Old Buildings* (Washington, D.C: The Preservation Press, 1981), and presented at the Smithsonian Institution, Washington, D.C., during National Historic Preservation Week, May 1980.

SCHOLARLY REVIEWS

Review of *Idaho's Bunker Hill: The Rise and Fall of a Great Mining Company, 1885-1981*, by Katherine Aiken, in *Oregon Historical Quarterly* 107 (Fall 2003): 471-473.

Review of *A Room for the Summer*, by Fritz Wolff, in *Montana: The Magazine of Western History* 56 (Summer 2006): 92-93.

Review of *Coal: A Human History*, by Barbara Freese, in *Technology and Culture* 46 (October 2005): 846-847.

Review of *Fish versus Power: An Environmental History of the Fraser River*, by Matthew D. Evenden, in *Environmental History Review* 10 (July 2005): 558-559.

Review of *DuPont: From the Banks of the Brandywine to Miracles of Science*, by Adrian Kinnane, in *Chemical Heritage* , 22 (Spring 2004): 44-45.

Review of *Mining Frontiers of the Far West, 1848-1880*, by Rodman Wilson Paul (Holt, Reinhart, and Winston, 1963, rev. ed. with additional chapters by Elliott West, University of New Mexico Press, 2001) in *Western Historical Quarterly* (Summer 2003): 242-243.

Review of *The Chimney of the World: A History of Smoke Pollution in Victorian and Edwardian Manchester*, by Stephen Mosley, in *Technology and Culture* 44 (July 2003): 620-621.

Review of *The Subterranean Forest: Energy Systems and the Industrial Revolution*, by Rolf Peter Sieferle, in *Technology & Culture* 44 (January 2003): 216-218.

Review of *Virtual Rivers: Lessons from the Mountain Rivers of the Colorado Front Range*, by Ellen E. Wohl, in *Environmental History* 7 (July 2002): 517-518.

Review of *Wealth, Waste, and Alienation: Growth and Decline in the Connellsville Coke Industry*, by Kenneth Warren, in *Enterprise and Society* 3 (June 2002): 383-385.

Review of *Petrolia: The Landscape of America's First Oil Boom*, by Brian Black, in *Environmental History* 7 (January 2002): 139-140.

Review of *Metal Mining in Canada, 1840-1950*, by Jeremy Mouat, in *IA: the Journal of the Society for Industrial Archeology* 27 (no. 2, 2001).

Review of *Wounding the West: Montana, Mining, and the Environment*, by David Stiller, in *Environmental History* 6 (January 2001): 127-128.

Review of *Smelter Smoke in North America: The Politics of Transborder Pollution*, by John D. Wirth, in *Technology & Culture* 42 (January 2001): 151-152.

Review of *True Gardens of the Gods: Californian-Australian Environmental Reform, 1860-1930*, by Ian Tyrrell, in *Environmental History* 5 (April 2000): 254-255.

Review of *Common Fields: An Environmental History of St. Louis*, edited by Andrew Hurley, in *American Studies Journal* 40 (Fall 1999): 187-188.

Review of *Managing the Industrial Heritage*, edited by Marilyn Palmer and Peter Neaverson, in *IA: The Journal of the Society for Industrial Archeology* 24 (no. 2, 1998): 53-54.

Review of *The Search for the Ultimate Sink: Urban Pollution in Historical Perspective*, by Joel Tarr, in *Historical Geography* 26 (1998): 228-230.

Review of *Race and Labor in Western Copper*, by Philip J. Mellinger, in *Montana: The Magazine of Western History* 47 (Autumn 1997): 84-85.

Review of *Environmental History Review*, Spring 1994, special issue on "Technology, Pollution, and the Environment," Joel A. Tarr and Jeffrey K. Stine, eds., and *Journal of Urban History*, May 1994, special issue on "The City and the Environment," Joel A. Tarr and Christine M. Rosen, eds., in *Technology & Culture* 36 (October 1995): 1038-1041.

Review of *Water Towers and Gas Tanks*, by Bernd and Hilla Becher, in *Design Book Review* 35/36 (Winter/Spring 1995): 56-59.

Review of *The Texture of Industry: An Archaeological View of the Industrialization of North America* by Robert B. Gordon and Patrick M. Malone, in *Environmental History Review* 18 (Winter 1994): 102-104.

Review of *Bisbee: Urban Outpost on the Frontier*, Carlos A. Schwantes, ed., in *Technology and Culture* 35 (April 1994): 435-436.

Review of *In the Servitude of Power: Energy and Civilization through the Ages* by Jean-Claude Debeir, Jean-Paul Deleage, and Daniel Hemery, in *Environmental History Review* 17 (Summer 1993): 97-98.

Review of *The Colossus of 1812: An American Engineering Superlative* by Lee H. Nelson, in *IA: The Journal of the Society for Industrial Archeology*, 16 (1990), No. 1.

Review of *Song of the Hammer & Steel* by Duane Smith, in *IA: The Journal of the Society for Industrial Archeology*, 14 (1988), No. 1.

SCHOLARLY PRESENTATIONS

"Conflict along the Edges of the Living and the Non-Living Environments: Mining v. Farming in Montana's Deer Lodge Valley in the Early Twentieth Century," paper presented at the annual meeting of the American Society for Environmental History, Baton Rouge, March 2007.

Keynote Address on "Technology, Environment, and Work" at the North American Labor History Conference, Detroit, October 2006.

"The Question of Authenticity When Applied to the Preservation of Components of Complex, Large-Scale Technological Systems," paper presented at the Fifth National Forum on Historic Preservation Practice, Goucher College, March 2006.

"Inhaling a Microscopic Artifact: Asbestos Dust and the Vermiculite Mine at Libby, Montana," paper given at the annual meeting, Society for Industrial Archeology, Milwaukee, June 2005.

"Interpreting a Large Industrial Artifact: The Case of the Whirley Cranes at Kaiser's Richmond Shipyards," paper presented at the annual meeting of the Society for Industrial Archeology, Providence, June 2004.

"History As Compliment to Scientific Field Data in Superfund Litigation," presentation as part of a panel titled, "Reading the Issue: Environmental History in *The Public Historian*," at the joint annual meeting of the American Society for Environmental History and the National Council on Public History, Victoria, BC, April 2004.

"Gold & Tailings: The Standard Mill at Bodie, California," paper presented at the annual meeting of the Society for Industrial Archeology, Montreal, Quebec, May 2003.

Organizer of and participant in a scholarly panel on "The Environmental History of Mining" at the annual meeting of the Mining History Association, Wallace, ID, June 2002.

"From Slimes to Hens Eggs: Visions of Tailings in Idaho's Coeur d'Alene Mining District, 1888-2001," paper presented at the annual meeting of the Society for Industrial Archeology, Brooklyn, June 2002.

"Integrating the Preservation of Cultural Resources with Remediation of Hazardous Materials: An Assessment of Superfund's Record," paper presented at the annual meeting of the American Society for Environmental History, Tacoma, WA, April 2000.

"Smoke and Tailings: An Environmental History of Copper Smelting Technologies in Montana, 1880-1920," public presentations based on PhD dissertation and illustrated with slides, given at Trinity Lutheran Church, Alameda, CA, July 2001; the Environmental Studies Program, St. Olaf College, Northfield, MN, October 1999; a Colloquium of the Office for History of Science and Technology, University of California at Berkeley, April 1999; the Parker Lecture Series, Lowell, MA, November 1998; Chemical Heritage Foundation, Philadelphia, October 1998; Froid Lutheran Church, Froid, MT, July 1998; Center for the Rocky Mountain West, Missoula, MT, March 1996.

"Physical Setting and the Shaping of Giant Smelters: A Comparison of the Great Falls and Anaconda Smelters," paper given at the annual meeting of the Society for Industrial Archeology, Savannah, GA, June 1999.

"Landscapes as Industrial Artifacts: Lessons from Environmental History," paper presented at Whither Industrial Archeology, a symposium sponsored by the Society for Industrial Archeology at Lowell National Historic Park, MA, November 1998.

"Government Intervention v. Economic Efficiency in the Abatement of Smelter Smoke Pollution: The Case of the Anaconda Smelter in the 1910s," paper given at the annual meeting of the Society for the History of Technology, Baltimore, MD, October 1998.

"On the Nature of Tailings: An Overview of Early Attitudes Towards Tailings Disposal in the

Montana Copper Industry," Montana State History Conference, Butte, MT, October 1996.

"Captain Couch of the Boston & Montana: A Self-Trained Mining Engineer and the Industrialization of Butte's Copper Mining District," paper presented at the annual meeting of the Western History Association, Denver, CO, October 1995.

"Conflict in the Science of Environmental Impact: The Anaconda Smelter Smoke Cases, 1902-1911," paper presented at the biennial meeting of the American Society for Environmental History, Las Vegas, NV, March 1995.

"Architects as Designers of Pre-World War II, Large-Scale Technological Systems: Edward W. Tanner and the Design of the Fort Peck Townsite," paper presented at session titled "Topics at the Intersection of Architectural History and the History of Technology" at the Annual Meeting of the Society of Architectural Historians, Seattle, WA, April 1995.

"The Concept of Industrial Waste: Smoke 'Nuisance' Cases in the Montana Copper Industry at the Turn of the Twentieth Century," paper presented at the annual meeting of the Society for the History of Technology, Lowell, MA, October 1994.

"Retarded Mechanization in the Connellsville Beehive Coke Industry," paper presented at the annual meeting of the Society for Industrial Archeology, Pittsburgh, PA, June 1993.

"EPA's Superfund in the Context of Other American Large-Scale Technological Systems," paper presented at the fifteenth annual meeting of the National Council on Public History, Valley Forge, PA, May 1993.

"Imposing an Industrial Order on the Northern Plains: Patterns of Truss Bridge Construction, 1880-1920," paper presented at the annual symposium of the Center for Great Plains Studies, Lincoln, NE, April 1993.

"Industrial Pollution on the Southwestern Pennsylvania Countryside: The Connellsville Beehive Coke Industry, 1880-1920," paper presented at the biennial meeting of the American Society for Environmental History, Pittsburgh, PA, March 1993. A longer version of this paper won the 1994 Newcomen Prize at the University of Pennsylvania.

"EPA Superfund: After a Decade, Why Is It Not an Effective Technological System?" paper presented at the annual meeting of the Society for the History of Technology, Madison, Wisconsin, October 1991.

"A Comparison of the U.S. Bureau of Reclamation's Cylinder-Gate and Ring-Gate Designs for Spillway Controls," paper presented at the 20th Annual Meeting of the Society for Industrial Archeology, Chicago, June 1991.

"Contribution of Railroads to Montana's Historic Bridge Landscape," presentation at the Montana History Conference, Livingston, MT, October 1988.

"Power for the Copper Industry: Hydroelectric Developments Along the Great Falls of the Missouri River, 1890-1957," paper given at the 17th Annual Meeting of the Society for Industrial Archeology, Wheeling, WV, May 1988.

"Historical Differences Between Hardrock Mining and Underground Coal Mining," presentation at the Montana History Conference, Helena, MT, October 1987.

"Industrial Urbanism on the Wheat Frontier: Minot, North Dakota, 1886-1929," paper given at the 15th Annual Meeting of the Society of Industrial Archeology, Cleveland, OH, June 1986.

"Superinsulation Retrofit: An Effective Integration of Community Economic Development and Community Energy Management," with James Masker and Ralph Wittcoff, presented at the Nebraska Energy Office National Colloquium on Community Energy Management as a Community Economic Development Strategy, Lincoln, NE, October 1984.

"Appropriate Technologies and Historic Preservation," paper given at the International Conference on the Conservation of Industrial Heritage (TICCIH), Lowell, MA, June 1984.

"Maintenance and Stabilization of Historic Bridges," paper given at the Annual Meeting of the Association for Preservation Technology, Banff, Alberta, October 1982.

"The Great Falls Smelter: Some Reflections on Its Significance," paper given at the Montana State History Conference, Great Falls, MT, October 1982.

"Superinsulation vs. Passive Solar Energy in Historic Buildings," paper given at the Annual Meeting of the Association for Preservation Technology, Washington, D.C., October 1981.

"Passive Solar Retrofit of Historic Structures," paper given at the Annual Meeting of the Association for Preservation Technology, Denver, CO, September 1979.

SCHOLARLY and RELATED ACTIVITIES

Served as peer reviewer for articles submitted to the following scholarly journals: *BC Studies*; *Environmental History*; *IA: the Journal of the Society for Industrial Archeology*; *Montana: the Magazine of Western History*; *Technology & Culture*.

Served as peer reviewer for book manuscripts for the University of Washington Press and the Montana Historical Society Press.

Served as a reviewer for grant proposals submitted to the National Science Foundation.

Panel organizer, "Defining Environmental Edges to Anaconda's Global Mining Enterprise," panel of three papers presented at the annual meeting of the American Society for Environmental History, Baton Rouge, March 2007.

Panel organizer, "Emergency Shipyards during World War II in the San Francisco Bay Area," panel of three papers presented at the annual meeting of the Society for Industrial Archeology, Providence, June 2004.

Co-organizer with Brian Shovers, Fall Tour of industrial and engineering sites in NE Montana, organized by the Klepetko (Montana) Chapter for the Society for Industrial Archeology, September 2003.

Panel organizer, "A Roundtable on the Environmental History of Mining," panel of three papers presented at the annual meeting of the Mining History Association, Wallace, ID, June 2002.

Panel organizer, "Tailings As Cultural Artifact," panel of three papers presented at the annual meeting of the Society for Industrial Archeology, Brooklyn, June 2002.

Chair of the Program Committee for the annual meeting of the Society for Industrial Archeology, Duluth, MN, June 2000.

Chair of the Program Committee, "Whither Industrial Archeology," a three-day symposium at Lowell, MA, featuring twenty-four speakers and co-sponsored by the Society for Industrial Archeology, Historic American Engineering Record, and Lowell National Historic Park, November 1998.

Organizer, industrial archeology tour of NE Montana, organized for the Klepetko (Montana) Chapter of the Society for Industrial Archeology, September 1995.

Panel organizer, "Topics at the Intersection of Architectural History and the History of Technology," a two-session panel featuring seven papers and a comment, presented at the Annual Meeting of the Society of Architectural Historians, Seattle, WA, April 1995.

Organizer, Coal and Coke Tour, organized for the Annual Meeting of the Society for Industrial Archeology, Pittsburgh, PA, June 1993.

Co-organizer with Brian Shovers, Fall Tour of Butte and Anaconda, Montana, organized by the Klepetko (Montana) Chapter for the Society for Industrial Archeology, October 1989.

Co-organizer with Brian Shovers, "Butte: The Urban Frontier," three-day history conference featuring twenty-six speakers and sponsored by the Butte Historical Society with major funding by the Montana Committee for the Humanities, Butte, MT, September 1982.

Project Director, Historic and Architectural Survey of over 3,000 structures in the Butte National Historic Landmark District, sponsored by the Butte Historical Society with major funding from the Montana State Historic Preservation Office and the Butte-Silver Bow Community Development Office, 1981-1985.

ORAL HISTORIES

Organized and conducted an oral history project as part of the research for an Expert Report for the U.S. Dept. of Justice in *U.S. v. Asarco, et al*; recorded 12 oral histories in communities in the Coeur d'Alene mining district, ID, December 2005 and April 2006.

Organized and conducted, in cooperation with the oral historian at the Montana Historical Society, the Libby Oral History Project as part of the research for an Expert Report for the U.S. Dept. of Justice in *U.S. v. W.R. Grace*; recorded 32 oral histories, April-June 2002.

Oral histories with three former shipyard workers, conducted in conjunction with research for the history of the Kaiser shipyards in Richmond, CA, being prepared for the Historic American Engineering Record.

Oral history of Guy Harris, retired chemist at Dow who developed and patented Z200, an important reagent used in the flotation of copper ores; Regional Oral History Office, Bancroft Library, University of California at Berkeley, 2001.

Oral histories with Joe & Carol Gwerder, farmers in California's Delta Region who spent their lives engaged in irrigated agriculture; Regional Oral History Office, Bancroft Library, University of California at Berkeley, 2001.

The Morrissey Oral History Workshop, training by Charles Morrissey during a three-day workshop at Fort Mason Center, San Francisco, March 2000.

Oral histories of thirteen early members of a rural electric co-op recalling the impacts of rural electrification on farm life in northeast Montana; sponsored by Sheridan Electric Co-op, 1997.

SELECT CONTRACT PUBLICATIONS AND PRESENTATIONS

“Expert Report,” November 2007, prepared for the Environmental Enforcement Section, U.S. Department of Justice, in the Midnite Mine (WA) Superfund litigation (*U.S. v. Newmont USA Limited, et al*). The report details the history of the management relationship between Newmont and its subsidiary, Dawn Mining Company, which operated the Midnite mine.

“Expert Report,” October 2006, prepared for the Coeur d'Alene Tribe of Indians in support of a mediation hearing intended to resolve differences between the Tribe and Avista, (formerly Washington Water Power) concerning compensation Avista owes the Tribe for having inundated portions of the Coeur d'Alene Indian Reservation as a consequence of the construction of the Post Falls dam, which allows Avista to utilize the lake to provide annual storage for a system of hydroelectric generating stations along the Spokane River.

Testimony before a mediator on behalf of the U.S. Attorney's Office for the Eastern District of New York in the case *TDY Holdings, Inc., v. United States* concerning allocation of costs for the Superfund remediation of the Li Tungsten site at Glen Cove, New York. Testimony concerned history of operations at the Wah Chang tungsten refinery, corporate history associated with the

operation, and the history of the federal government's involvement in the operations during the World War II years; January 2005.

"Synthesis Report," a report written under contract to the Historic American Engineering Record for the Rosie the Riveter/World War II Home Front National Historical Park (RORI), Richmond, CA, and synthesizing more than a dozen reports prepared for RORI on physical resources in Richmond dating from the WWII period, on historic sites in the San Francisco Bay Area relating America's WWII mobilization, and on historical themes reflecting Americans' experiences on the home front during the war, December 2004.

"The Kaiser Shipyards," business and technological history of Kaiser's Richmond shipyards, written under contract to the Historic American Engineering Record for the Rosie the Riveter/World War II Home Front National Historical Park, Richmond, CA, July 2004.

"The Ford Motor Company Assembly Plant," business and technological history of the Ford Assembly Plant in Richmond, CA, a.k.a. the Richmond Tank Depot, written under contract to the Historic American Engineering Record for the Rosie the Riveter/World War II Home Front National Historical Park, Richmond, CA, September 2003.

"Phase II Expert Rebuttal Report," January 2003, prepared for the firm Beshears Muchmore Wallwork, representing two of the plaintiffs (Phelps Dodge Miami, Inc., and Inspiration Consolidated Copper Company) in the Superfund litigation *Pinal Creek Group v. Newmont Mining Corporation, et al.* The report presents my expert opinions concerning the economic integration of mining companies operating in the Globe/Miami district of Arizona.

"Expert Report," July 2002, prepared for the Environmental Enforcement Section, U.S. Dept. of Justice, in *U.S. v. W.R. Grace*, the Libby, MT, Superfund case. The report describes the mining and mineral processing history of the W.R. Grace/Zonolite vermiculite operation at Libby.

"Second Supplemental Expert Report," July 2002, prepared for the firm Beshears Muchmore Wallwork, representing the plaintiffs in the Superfund litigation *Pinal Creek Group v. Newmont Mining Corporation, et al.* The report provides additional historical details concerning the corporate relationship between the Inspiration Consolidated Copper Company and the Anaconda Copper Mining Company.

"Supplemental Expert Report," January 2002, prepared for the firm Beshears Muchmore Wallwork, representing the plaintiffs in the Superfund litigation *Pinal Creek Group v. Newmont Mining Corporation, et al.* The report provides additional historical details concerning the corporate relationship between the Inspiration Consolidated Copper Company and the Anaconda Copper Mining Company.

"History and Heritage of Civil Engineering," historian of technology for developing an interactive web site (www.asce.org/history/) mounted in commemoration of the sesquicentennial of the American Society of Civil Engineers (ASCE); sub-contract to Convey, Inc., October 2001.

"Determination of Eligibility for the Contra Costa Power Plant," Antioch, CA, prepared under contract to URS-Dames & Moore for Southern Energy, Oct. 2000.

"The Standard Mill at Bodie, CA," narrative history written under contract to the Historic American Engineering Record for California State Parks, Sept. 2000.

"Expert Report," March 2000, prepared for the Environmental Defense Section, U.S. Dept. of Justice, in the Stibnite/Yellow Pine Superfund litigation (*Mobil Oil Corp. v. U.S.*) in Idaho. The report describes the tailings-disposal methods used by the Bradley Mining Company, 1932-1952.

"Expert Report," February 2000, prepared for the firm Muchmore & Wallwork, representing the plaintiffs in the Superfund litigation *Pinal Creek Group v. Newmont Mining Corporation, et al.* The report is a corporate and operational history of the Inspiration Consolidated Copper

Company in the context of the corporate and operational history of the Anaconda Copper Mining Co., which owned a minority share of Inspiration stock but controlled the Inspiration operations.

"Expert Report," August 1999, prepared for the Environmental Enforcement Section, U.S. Department of Justice, in the Bunker Hill (ID) Superfund litigation (*U.S. v. ASARCO, et al.*). The report includes technological and business histories of the lead-silver concentrators operating in the Coeur d'Alene mining district and a history of the movement of tailings and other contaminants through the Coeur d'Alene River system.

"Expert Report," August 1997, prepared for the Environmental Enforcement Section, U.S. Department of Justice, in the Clark Fork (MT) Superfund litigation (*U.S. v. ARCO*). The report includes technological histories of the silver mills, copper smelters, zinc concentrators, and manganese plant at Butte and Anaconda, Montana, as well as histories of the Anaconda Smelter Smoke Commission and a series of land exchanges effected by the Anaconda Copper Mining Company and the U.S. Forest Service.

"The Anaconda Smelter Smoke Commission: A Technological History," May 1997, Expert Report prepared for the Environmental Defense Section, U.S. Department of Justice, in the Clark Fork (MT) Superfund litigation (*U.S. v. ARCO*). In addition to a history of the Smoke Commission, the report includes a technological and pollution history of the Anaconda Copper Mining Company's smelters at Anaconda.

"Sheridan Electric Co-op: A History of Its Organizing," a history written to commemorate Sheridan Electric's 50th annual membership meeting, October 1997. The project is accompanied by the recording of about a dozen oral histories of early co-op members recalling the impacts of rural electrification on farm life in northeast Montana.

"Connellsville Coal and Coke Study," a business and technological history of the Connellsville Coke Region for the America's Industrial Heritage Project, Historic American Engineering

Record (HAER), National Park Service, September 1992. Transmitted to the Library of Congress as "Connellsville Coal & Coke Region, HAER No. PA-283," the historical narrative accompanying HAER measured drawings of beehive coke ovens in the region, 1995.

"Selby Avenue Bridge, HAER No. MN-61," Historic American Engineering Record narrative

and large format photographs, sub-contract to Robert M. Frame III for the Department of Public Works, St. Paul, MN, September 1992.

"Historic Bridges in North Dakota," statewide survey and determination of eligibility, with Lon Johnson, Mark Hufstetler, and Charlene Roise, contract to North Dakota State Department of Transportation, May 1992.

"Deer Flat Embankments, HAER No. ID-17-B," with Amy Slaton (RTI), Historic American Engineering Record narrative history, contract to Pacific Northwest Region, U.S. Bureau of Reclamation, December 1991.

"Owyhee Dam, HAER No. OR-17," with Amy Slaton (RTI), Historic American Engineering Record narrative history, contract to Pacific Northwest Region, U.S. Bureau of Reclamation, September 1991.

"Determination of Eligibility for Historic Resources at Camp Grafton, ND," contr. to Omaha District U.S. Army Corps of Engineers for the North Dakota National Guard, March 1991.

"Boise Project Office, HAER No. ID-17-C," (RTI) Historic American Engineering Record history, contract to Pacific Northwest Region, U.S. Bureau of Reclamation, September 1990.

"Dams of the Upper Souris National Wildlife Refuge, HAER No. ND-3" and "Dams of the J. Clark Salyer National Wildlife Refuge, HAER No. ND-4," with Mary McCormick (RTI), Historic American Engineering Record narrative history & large-format photography, contract to St. Paul District U.S. Army Corps of Engineers for U.S. Fish and Wildlife Service, August 1990.

"Historic Bridges in South Dakota," statewide survey & determination of eligibility, with Lon Johnson, contract to South Dakota Department of Transportation, October 1990.

"Determination of Eligibility for Seven Bureau of Reclamation Dams in Oregon, Idaho, and Wyoming," with Jeffrey A. Hess, contract to Pacific Northwest Region, Bureau of Reclamation, October 1989.

"Blaine Spring Creek Bridge, HAER No. MT-63" and "Upper Madison Bridge, HAER No. MT-64," with Lon Johnson, Historic American Engineering Record narrative history and large format photographic documentation, sub-contract to Ethos Consulting for Montana Highway Department, June 1989.

"Crow Agency Historic Complex, HABS N. MT-79," with Mary McCormick, Historic American Buildings Survey narrative history and large format archival photographic documentation of five buildings at Crow Agency, contract to the Bureau of Indian Affairs, June 1989.

"Rocky Boy's Agency Flour Mill, HABS N. MT-76," Historic American Building Survey narrative history & photographic documentation, contract to Billings Area Office, Bureau of Indian Affairs, October 1988.

"Reconnaissance Surveys of Crosby and Velva, North Dakota," with Dale Martin, contract to State Historical Society of North Dakota, September 1988.

"Determination of Eligibility of Five C&NW Bridges and a Freight Depot at Sioux Falls, South Dakota," contract to Chicago and Northwestern Railroad, June 1988.

"Historic Iron and Steel Bridges in Minnesota, 1873-1940," statewide survey and preparation of historical context for the Minnesota Historical Society, with Dale Martin, subcontract to Jeffrey A. Hess, June 1988.

"Determination of Eligibility of Four Montana Power Company Hydroelectric Generating Facilities Near Great Falls, Montana," with Mary McCormick, contract to the Montana Power Company, May 1988.

"Hardin City Water Works, HABS No. MT-71," Historic American Buildings Survey Narrative Architectural History, contract to City of Hardin, Montana, September 1987.

"Determination of Eligibility of Buildings at Six BIA Agencies in Montana," with Mark Fiege, contract to Billings Area Office, Bureau of Indian Affairs, September 1987.

"Fort Peck Townsite, HABS No. MT-70," Historic American Buildings Survey Narrative Architectural History, contract to Omaha District U.S. Army Corps of Engineers, May 1987.

"Determination of Eligibility of the Madison River Dam and Power Plant," with Mark Fiege, contract to Montana Power Company, April 1987.

"Historic Resources of North Side Fargo: Inventory and Assessment," with Mark Fiege and Jack Crowley, contract to the Fargo Historical Society, August 1986.

"Final Report on the Intensive and Reconnaissance Surveys for Minot, North Dakota," with Mary McCormick, contract to the State History Society of North Dakota, December 1985.

"Flint Creek Powerhouse and Dam: A Determination of Eligibility for the National Register of Historic Places," with Mark Fiege, contract to the Montana Power Company, December 1985.

"Preservation of a Neighborhood: A Neighborhood Preservation Plan for Central Butte," with Bruce von Alten & Jim E. Richard, contract to Butte Community Union, November 1985.

"Industrial Heritage of Butte and Anaconda: An Analysis of the Historical Significance of the Surviving Physical Features of the Anaconda Copper Mining Company," with Mark Fiege and Brian Shovers, contract to the Butte Historical Society, September 1985.

"Butte-Anaconda Historical Park System Master Plan," with Dennis Glick and Mark Fiege, contract to the Butte Historical Society, September 1985.

"The Western Clay Manufacturing Co.: An Historical Analysis of Its Plant and Its Development," contract to the Archie Bray Foundation, February 1985.

"Milltown Dam: A Determination of Eligibility for the National Register of Historic Places," contract to the Montana Power Company, December 1984.

"Development of the Built Environment in the Original Townsite of Hardin, Montana," contract to the Big Horn County Historical Museum, September 1984.

"Cultural Resource Inventory and Evaluation Project, Homestake Mining Company Properties, Jardine, Montana," with Peter Steere and Paul Anderson, contract to Homestake Mining Company, April 1982.